

SUPPORT FOR THE AMENDMENTS

This Amendment cancels Claims 14-17; and amends Claims 1-13. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claim 1 is found in canceled Claims 14 and 16. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 1-13 will be pending in this application. Claim 1 is independent.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

Conventionally, to give galvanized steel sheet better tribological properties during forming, a film of lubricating oil is applied to its surface. Specification at page 1, lines 16-19. However, even when an oil film of sufficient weight, i.e., greater than 1 g/m^2 , is applied to the surface of the galvanized sheet, it has not been possible to maintain a uniform distribution of the oil film over the surface of the sheet due to a phenomenon known as dewetting. The dewetting phenomenon results in areas of the galvanized sheet that are deficient in oil, have a relatively high friction coefficient, and are prone to corrosion. Specification at page 1, line 31 to page 2, line 16.

The present invention provides a method of lubricating a galvanized steel sheet during forming using significantly less lubricating oil than has been conventionally used. According to the present invention, before applying lubricating oil and forming, a steel sheet coated with a metal coating based on zinc or its alloys is treated with an aqueous treatment solution, which forms on the metal coating an upper layer based on zinc hydroxysulfate and zinc sulfate. The upper layer based on zinc hydroxysulfate and zinc sulfate makes it possible to

reduce the degradation (into powder or particles) of the galvanized surface of the sheet while it is being formed, to reduce the quantity of lubricating oil to be deposited on the sheet before it is formed, and to improve the temporary corrosion resistance of the sheet. Specification at page 2, lines 18-26. The weight of lubricating oil film applied is between 0.2 and 0.5 g/m², since such weights are sufficient to obtain excellent temporary corrosion protection and to avoid any risk of contamination of workshops and forming tools. Specification at page 8, lines 28-33.

Claims 1-13 and 17 are rejected under 35 U.S.C. 102(b) over WO 00/15878, whose corresponding English-language equivalent is U.S. Patent No. 6,528,182 ("Bello").

Claim 14 is rejected under 35 U.S.C. 102(b) or, in the alternative, under 35 U.S.C. 103(a), over WO 00/15878, whose corresponding English-language equivalent is Bello.

Claims 15-16 are rejected under 35 U.S.C. 103(a) over WO 00/15878, whose corresponding English-language equivalent is Bello.

Bello discloses zinc coated steel plates coated with a pre-lubricating hydroxysulphate layer. Bello at title. Bello discloses that prior to deep-drawing (forming) tests pre-lubricated plates were "oiled in standard manner ... ; standard oiling consists here in applying on the treated surface oil ... so as to obtain a layer of about 1 g/m²". Bello at column 8, lines 7-14.

However, Bello fails to suggest, prior to forming, oiling to obtain a layer of less than about 1 g/m². Thus, Bello fails to suggest the independent Claim 1 limitation of "applying on the upper layer based on zinc hydroxysulfate and zinc sulfate a lubricating oil film with a weight of between 0.2 and 0.5 g/m²".

Furthermore, because Bello discloses that a lubricating oil layer of about 1 g/m² is standard, and the specification discloses that even with a standard oil layer of about 1 g/m² dewetting can result in galvanized sheet areas that are deficient in oil, have a relatively high friction coefficient, and are prone to corrosion, there is no reasonable expectation that Bello

would have led the skilled artisan to an oil layer half of Bello's standard 1 g/m^2 to reach the independent Claim 1 limitation of "applying on the upper layer based on zinc hydroxysulfate and zinc sulfate a lubricating oil film with a weight of between 0.2 and 0.5 g/m^2 ".

Moreover, there is no suggestion to use a prelubricating treatment of Bello in order to avoid powdering during forming. The Document D2 (from Kunde N.D. et al., cited in the list of references and in the International Search Report) is a publication concerning the prephosphate treatment that constitutes the state of the art of Document D1 (Bello). Document D2 shows that powdering during forming appears on a steel sheet which has been submitted to a prephosphate treatment. Therefore, a man skilled in the art would understand from this document that a prelubricant treatment leads to powdering during forming. Therefore, it is not obvious to use a prelubricating treatment of Bello in order to avoid powdering during forming.

Any *prima facie* case of obviousness based on Bello is rebutted by the significant reduction in friction coefficient that is achieved by the invention of independent Claim 1 by "applying on the upper layer based on zinc hydroxysulfate and zinc sulfate a lubricating oil film with a weight of between 0.2 and 0.5 g/m^2 ". This is demonstrated in the specification at Table 2, reproduced below.

Table 2

Clamping force (MPa)	Friction coefficient					
	Weight of oil on the sheet treated according to the invention			Weight of oil on the untreated sheet		
	0.25 (g/m ²)	1.0 (g/m ²)	2.5 (g/m ²)	0.25 (g/m ²)	1.0 (g/m ²)	2.5 (g/m ²)
30	0.13	0.12	0.12	0.20	0.15	0.15
50	0.11	0.11	0.11	0.20	0.17	0.17

Table 2 shows that sheet treated in accordance with the present invention to obtain the upper layer based on zinc hydroxysulfate and zinc sulfate exhibited lower friction coefficients than untreated sheet for oil weights of 0.25 g/m², 1.0 g/m² and 2.5 g/m².

Significantly, in Table 2:

The results obtained show that a reduction in the weight of oil results in a substantial **increase** in the **friction coefficient** when **no treatment solution** according to the invention is applied before applying the oil film.

However, when the **treatment solution** according to the invention has been **applied** to the galvanized sheet prior to application of the lubricating oil film, the **friction coefficients** obtained are **very low, even with oil weights of less than 0.5 g/m²**. Specification at page 14, lines 5-15 (emphasis added).

While Table 2 shows that for untreated sheet friction coefficient increases as oil weight decreases below Bello's standard oil weight (1 g/m²) to 0.25 g/m², for treated sheet friction coefficient essentially stays the same as oil weight decreases to 0.25 g/m².

Bello fails to suggest the significant reduction in friction coefficient at low oil weights that is achieved by the invention of independent Claim 1 by "applying on the upper layer based on zinc hydroxysulfate and zinc sulfate a lubricating oil film with a weight of between 0.2 and 0.5 g/m²".

Thus, any *prima facie* case of obviousness based on Bello is rebutted.

Because Bello fails to suggest all the limitations of independent Claim 1, there is no reasonable expectation of success, and any *prima facie* case of obviousness based on Bello is rebutted, Bello fails to render obvious independent Claim 1. Thus, the rejection over Bello should be withdrawn.

Claims 1-17 are rejected on the ground of nonstatutory non-obviousness-type double patenting over Claims 7-18 of Bello. Claims 17-18 of Bello are directed to a method for forming a steel plate coated with a metal layer based on zinc, the method comprising the steps of treating the surface of the coated plate with an aqueous treatment solution, applying a film of lubricating oil on the resulting treated surface and forming the plate.

However, Claims 7-18 of Bello are silent about any amount of lubricating oil, and fails to suggest the independent Claim 1 limitation of "applying on the upper layer based on zinc hydroxysulfate and zinc sulfate a lubricating oil film with a weight of between 0.2 and 0.5 g/m²".

Furthermore, as discussed above, because Bello discloses that a lubricating oil layer of about 1 g/m² is standard, and the specification discloses that even with a standard oil layer weight of about 1 g/m² dewetting can result in galvanized sheet areas that are deficient in oil, have a relatively high friction coefficient, and are prone to corrosion, there is no reasonable expectation that Claims 7-18 of Bello would have led the skilled artisan to an oil layer weight half of Bello's 1 g/m² to reach the independent Claim 1 limitation of "applying on the upper

layer based on zinc hydroxysulfate and zinc sulfate a lubricating oil film with a weight of between 0.2 and 0.5 g/m²".

Moreover, any *prima facie* case of obviousness based on Claims 7-18 of Bello is rebutted by the significant reduction in friction coefficient that is achieved by the invention of independent Claim 1 by "applying on the upper layer based on zinc hydroxysulfate and zinc sulfate a lubricating oil film with a weight of between 0.2 and 0.5 g/m²". This is demonstrated in the specification at Table 2, discussed above. Claims 7-18 of Bello fails to suggest the significant reduction in friction coefficient that is achieved by the invention of independent Claim 1 by "applying on the upper layer based on zinc hydroxysulfate and zinc sulfate a lubricating oil film with a weight of between 0.2 and 0.5 g/m²". Thus, any *prima facie* case of obviousness based on Claims 7-18 of Bello is rebutted.

Because Claims 7-18 of Bello fails to suggest all the limitations of independent Claim 1, there is no reasonable expectation of success, and any *prima facie* case of obviousness based on Claims 7-18 of Bello is rebutted, the obviousness-type double patenting rejection over Claims 7-19 of Bello should be withdrawn.

Claims 4-7 and 11-16 are objected to under 37 CFR 1.75(c) as being in improper form. To obviate the objection, the claims are amended by removing improper multiple dependencies.

Claims 1-13 and 17 are rejected under 35 U.S.C. 112, second paragraph. In addition, Claims 1-14 are rejected under 35 U.S.C. 101. To obviate the rejections, the claims are amended to recite active, positive steps.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below

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Respectfully submitted,

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A handwritten signature in cursive script, reading "Corwin Paul Umbach". The signature is written in dark ink and is positioned above a horizontal line.

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